DOCUMENT RESUME

ED 480 520 CG 032 596

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TITLE	The Living Career: Complexity, Chaos, Connections and Career.
PUB DATE	2003-11-00
NOTE	11p.; In: Global Realities: Celebrating Our Differences, Honoring Our Connections; see CG 032 572.
PUB TYPE	Information Analyses (070) -- Opinion Papers (120)
EDRS PRICE	EDRS Price MF01/PC01 Plus Postage.
DESCRIPTORS	*Career Development; *Chaos Theory; *Counseling Theories; *Theory Practice Relationship
IDENTIFIERS	*Complexity Theory

ABSTRACT

The purpose of this paper is to present a theory of career development drawn from current work in the physical and biological sciences, specifically work that is associated with chaos and complexity theories. The paper includes specific suggestions for practice based upon the theory and reflections of career professionals on its use. The theory and its applications can be used to help clients utilize principles of chaos and complexity, understand the unity underlying change, create new, satisfying forms and recognize the "strange attractors" that are the unique organizing linchpins of their lives. (Contains 10 references.) (GCP)

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by
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The Living Career: Complexity, Chaos, Connections and Career

Deborah P. Bloch

Introduction

The living career exists in both order and chaos. Fixed in school or work, people are thrust into change. The change may come from an expected source such as graduation from high school, choosing a new job, or beginning retirement, or from an unexpected source such as a layoff or firing, a difference in family circumstance, or an illness. These changes may seem unnatural and unasked for. Anticipated or not, changes often provoke uncertainty and discomfort. People feel adrift.

Given the seeming conflict between the actuality of their lives and the human predisposition to seek order, individuals often experience their own careers as illogical, having no clear relationships between actions and reactions. They believe there is some sequence of work roles that they are expected to follow. They believe that others make career decisions based on logical links of past experience, and that others expect this logic of them as well. But that is not what most people experience. That is why many people keep the real stories of their careers secret. They keep to themselves the strange links between events, links they describe as "just luck" or coincidence. In truth, it is the secret career stories that reveal the reality. The reality consists of a tension between order and disorder in a completely interconnected universe. Indeed it is this tension between order and disorder that is at the heart of living systems, systems as diverse as single cell organisms and evolution. And it is the tension between order and disorder of the individual living entity as well as its place in a completely interconnected universe that is explored and explained through chaos and complexity theories.

Purpose

The purpose of this paper is to present a theory of career development drawn from current work in the physical and biological sciences, specifically work that is associated with chaos and complexity theories. But theory alone is insufficient. Therefore the paper includes specific suggestions for practice based upon the theory and reflections of career

professionals on its use. The theory and its applications can be used to help clients utilize principles of chaos and complexity, understand the unity underlying change, create new, satisfying forms and recognize the "strange attractors" that are the unique organizing linchpins of their lives.

This theory of career as a living entity differs from earlier career development theories, what might be called *classic career development.* Classic career development theories rely on the scientific approaches prevalent in all fields throughout most of the twentieth century. These approaches depend on an understanding that finding and isolating all the parts will lead to the total or sum of knowledge about a phenomenon or organism, yielding reliable predictions and replicable interventions. This is the basis of what has been called the scientific method, a method based on logical positivism. In reductionist science, the focus is on identifying structures and processes. In career development, the two theoreticians whose work exemplifies the best of structure and process approaches are, respectively, Holland and Super. However, in the late twentieth century many supposedly immutable truths were thrown into question not by those who simply questioned the truths, but by those who had gone beyond doubting the individual beliefs to doubting the very system of thought in which the beliefs were constructed. The theory of relativity and subsequent discoveries in physics overturned the previous truth of Newtonian or classic physics as certainly as Copernicus and Galileo overthrew the belief system of the ancients. Investigations into complex phenomena in both the physical and biological sciences have shown that an understanding of relationships, subsuming structure and function, is a more fruitful path to understanding complex adaptive entities. The resulting theories fall under the rubrics of *chaos theory, complexity theory,* and *nonlinear dynamics,* the last being the more general term. Career development theorists and researchers have yet to explore these approaches in any detail. The career development theory presented in this paper focuses on relationship and nonlinear dynamics. It is the theory of career as a complex adaptive entity—a living system—a theory that enables career practitioners to understand and explain what otherwise appears to be the messiness of life, a theory that reveals the underlying order in what otherwise appears to be random.

Interestingly, the ever-widening and ever-narrowing webs of relationships that are revealed in the examination of complex adaptive entities can lead to an understanding that, as Bronowski (1978) wrote in his introduction to a series of lectures to the scientific community, "the world is totally connected: that is to say that there are no events anywhere in the universe which are not tied to every other event in the universe" (p. 58). This sense of connection is the essence of spirituality. In *A Spiritual Audit of Corporate America,* Mitroff & Denton (1999) found virtually

unanimous agreement on the definition of spirituality among executives, managers and workers at all levels in a variety of industries. In essence the definition had two components: first, that spirituality included a sense of connection to something beyond the individual; and second, that spirituality is a search for meaning, purpose, and integration in life.

The next part of this paper presents eleven key principles of chaos and complexity theory and applies each of them to career development. The following section provides specific suggestions for practice based on the eleven principles. A final section provides both a summary and concluding thoughts on the meaning of chaos, complexity, and connections for us as humans.

1. Autopoesis

Complex, adaptive entities have the ability to maintain themselves although their components and even their shapes may change. In this sense, they have life. Life is the ability of the entity to maintain itself or *autopoesis.* Life is self-organizing, not controlled externally. Life is the ability to adapt to changing environments.

Autopoesis or self-regeneration in career development. People continually reinvent their careers moving freely among, within, and outside the macro-cycles and roles previously identified as the anticipated career paths of "healthy" individuals. Whether or not people receive career counseling or participate in any career education programs, they have careers. This is not to suggest that the efforts of the career counseling profession are in vain or even unnecessary, but to point out that the original idea that career development is a natural, internal process is borne out by the acceptance of career as a complex, adaptive entity.

2. Open Exchange

Entities are *open.* They maintain themselves through the continuous flow and interchange of components or energy. There is an ongoing interplay of the internal and external.

Open exchange in career development. Career requires a living human body in which it functions in continuing exchange with all the entities of that body. In addition, career cannot take place for the individual alone. By its very nature, career requires participation of give and take in the outside world, that is, labor markets. These relationships are complex and dynamic but nevertheless hark back to the foundational work of Frank Parsons.

3. *Networks*

In these exchanges, entities are part of *networks.* Any entity is part of

many networks which can be depicted not only as concentric circles but as ever-widening links to nodes beyond itself. At the same time, a particular entity may have networks operating within it.

Networks in career development. The relationships among the physical, psychological, neural, and spiritual aspects of the individual are neither unitary nor linear but exist in interweaving networks. So too career is an entity within the system of the individual but it is also part of the surrounding networks of education, occupations, industries, particular employers, needs of the community and the local and global economies, cultures—to mention just a few. These are ongoing relationships which operate, affect and are affected by the entity of each career.

4. *Fractals*

Entities are parts or *fractals* of other entities. Each fractal has the entirety of the organism within its shape. Every organism is a fractal of the universe. Fractals reveal themselves as irregular structures that are self-similar at different scales of manifestation. Like a hologram, fractals show the same features at different levels of examination from the closest look at the smallest elements to the most distant view of what appears to be the entire organism.

Fractals in career development. The career of any person is a fractal of that person's entire life experience. Because career is a fractal of one's life, in examining a career, one sees the patterns and dynamics of the whole life. In addition, the careers of many people are fractals of the workforce experience. They are fractals in that the parts are similar to the whole.

5. *Phase Transitions*

Entities are dynamic. In the constant exchange of forms, components, and energy they move between order and chaos. These *phase transitions* are comparable to the movement of water among its three phases: liquid, solid or ice, and gas or steam. Phase transitions are the opportunity for creativity and the emergence of new forms.

Phase transitions in career development. From a state of being fixed in school or work, one is thrown into change, from order to chaos. These career changes occur because of any combination of the relational networks busily and openly in exchange with the entity of career. In this model, graduation, being fired, ambition, illness, the influence of significant others, and virtually any event are all potential sources of phase transitions.

6. *Fitness Peaks*

During phase transitions, entities seek *fitness peaks*, that is the state that will yield the greatest chance of survival. Kauffman (1995) in *At Home in*

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the Universe wrote: "I suspect that the fate of all complex adapting entities in the biosphere—from single cells to economies—is to evolve to a natural state between order and chaos, a grand compromise between structure and surprise....The edge-of-chaos then also arises as a potential general law. In scaling the top of the fitness peaks, adapting populations that are too methodical and timid in their explorations are likely to get stuck in the foothills, thinking they have reached as high as they can go; but a search that is too wide ranging is also likely to fail" (p. 15).

Fitness peaks in career development. During phase transitions, career is characterized by the search for the best that each individual can imagine for her or himself. However, like all entities, the career search for fitness peaks may be limited by excessive timidity or excessive risk-taking as well as the networked relationships and exchanges taking place at the time and all the time.

7. Nonlinear Dynamics

Phase transitions are best explained by *nonlinear dynamics*. In linear dynamics, there is an expectation that changes of equal sizes will produce equal effects. There is also the assumption that causation is, if not uni-dimensional, then easily studied through multiple regression methods. Complex entities, however, behave in nonlinear ways. Because the transitions between order and chaos are drawing upon multiple causes from multiple network relationships, the dynamics are fuzzy.

Nonlinear dynamics in career development. Each person's career development pattern makes sense in terms of that entire person's work life, the specific dynamics of the environment in which it occurred, and the internal dynamics of that person. So, too, people experience parts of their careers which seem to form patterns for them but these patterns are either not explicable, or are only partially explained, in terms of the patterns of other careers. The career development of each individual is a series of choices that have internal harmonics or resonances for that individual and can only be understood in terms of that individual.

8. *Sensitive Dependence*

Small changes bring about large effects. Within the non-recurring, nonlinear patterns, small changes may be seen to bring about large effects. This phenomenon, known as *sensitive dependence*, is a quality of all complex entities. No matter how similar the starting states of dynamic entities, one can be sure that they will "drift apart" after a while. The difference in results stems not from the external cause alone but from the condition of the organism or body itself. Relative degrees of sensitivity change effects.

Sensitive dependence in career development. Apparently random, often

small, events may lead to major career shifts.

9. *Torus Attractors and Bagel Patterns*

As the entity moves through its transition, it may retain its life by repeating similar but not identical patterns, held in place by *torus attractors*. The oxymoron *non-recurring patterns* describes entities in this state. Patterns formed by torus attractors are often described as doughnuts, or bagels, as round and round the same circle the events go, never exactly repeating themselves, but never leaving the circumscribed area.

Torus attractors in career development. Some careers appear to be formed by torus attractors, that is the patterns are clearly repeated with slight differences in each repetition, even with already experienced negative results. Careers formed by torus attractors may feel comfortable at times but the awfulness of the repeated pattern is the illusion of change followed by the recognition of being stuck.

10. *Strange Attractors and Emergence*

However, as the entity moves through its transition, it may retain life through the creation of new forms, a quality known as *emergence*. *Strange attractors* yield entity shapes that are neither linear nor contained. When they are plotted mathematically, the patterns will each form unique figures or fractals.

Strange attractors in career development. Strange attractors allow careers to take new shapes and emerge in forms quite varied from those seen before. Life has surprises; unexpected opportunities arise. Even in careers in which an individual has stayed in one occupation and industry, emergence is present to the extend that the individual continues to learn, therefore to emerge. This apprehension of emergence creates a sense of satisfaction, flow, even joy.

11. *Spirituality*

Complex, adaptive entities exist only as part of nested inseparability or connectedness. In other words, there are no living entities without interdependence. *Spirituality* is the experience of this unity.

Spirituality in career development. As a complex adaptive entity, career can only exist as part of nested inseparability or connectedness. In other words, there are no careers without interdependence. *Spirituality* in work is the experience of this unity. Career counseling is, in this sense, spiritual counseling. Seeing work as spiritual enables each person to consider his or her contribution to the world, to the ongoing creation of the universe. This view gives value to each career. At the same time as this view may save one from self-centeredness, it also enables a perspective that: "Our individual microscale activity in all its uniqueness can count in a way

classical science never imagined" (Goerner, 1995, p. 36). Finally seeing one's career as spiritual avoids the moral schizophrenia between life and work. It adds both an ethical dimension and a dimension of love.

Applications to Practice

The following suggestions have come out of my own thinking and work and from career professionals in workshops. I am particularly grateful to participants in two workshops, held in Australia in February and March 2003, for their contributions.

Classic career development theories and related instruments and methodologies of structure and processes explain parts of the whole but are not additive. The place to begin in practice is with the whole. You can usually move to the parts from the whole, but beginning with the parts cannot get to the whole picture. Narrative approaches are certainly not new to career development. As Savickas (1997) wrote, "The empirical tradition of rational career counseling does not encompass complex human qualities such as spirit, consciousness, and purpose. Science examines parts; personal stories explain the whole" (p. 9).

In working with individuals, understand that the opportunity for creativity occurs at the transition points. Everything depends on a) recognizing phase transitions, b) recognizing attractors of the past, and c) seeking fitness peaks. Listen to the stories to help individuals find the links and nodes of their networks. Use storytelling to help clients identify who they are—not just their occupational titles—and where they fit in the larger picture. Provide paper and crayons or markers or other means of expression through playful activities. Mosca (1995) suggested that narrative and play are the most effective methods for helping clients and students seek happiness. He defined happiness as "the potential to be totally consonant with what is as it unfolds" (p. 181). Many suggestions for ways to begin story telling and for using visual as well as verbal techniques are presented in *SoulWork: Finding The Work You Love; Loving The Work You Have* (Bloch & Richmond, 1998).

Knowing that change is inevitable but uncomfortable, use the concepts of complexity theory to help reduce client discomfort. Help clients recognize their transferable skills as ways of reducing the discomfort of chaos. Help clients understand the power of small changes and help them identify those they might attempt. Help clients and students assess the degree of risk that is appropriate during phase transitions.

Help clients who want to rush off the edge of chaos to see where, in the past, the rushing itself has been a torus attractor and led to non-satisfying outcomes. Allow time for what Gelatt (1989) has termed "positive uncertainty." Recognize our own discomfort at the edge of chaos and don't

rush clients away from the edge of chaos. Explore how individual careers are kept alive—by torus attractors, strange attractors or a mix of the two. Career interests, career anchors, social and socio-economic constraints, habits of mind, and other internal and external factors are examples of possible attractors. Identify your own patterns and dynamics and how they influence your work.

In career education, career coaching and career development programs, stress the opportunities presented by phase transitions since change is the only certainty.

Recognize the need to feel connections—the spiritual aspect of work—and make a space for clients to discuss this in their stories or play. Utilize non-threatening instruments, such as the *Salient Beliefs Review: Connecting Spirit and Work* (Bloch, 2003) to help clients discuss the connections and disconnections they are experiencing.

Summary and Conclusion

The previous section ended with the need to recognize clients' spirituality. This idea was placed at the end not because it is least important but because it is most important. Using complexity and chaos theories, or nonlinear dynamics, we see the inextricable webs of life. In these webs, each person's career is both effect and cause. It is only by looking both closely and from afar that we can see how important we are to each other. As career professionals we have the opportunity to see not only how the world has affected our clients but how our clients, and their work, affects the world.

"A human being is a part of the whole that we call the universe, a part limited in time and space. He [sic] experiences himself, his thoughts and feelings, as something separated from the rest—a kind of optical illusion of his consciousness. This illusion is a prison for us, restricting us to our personal desires and to affection for only the few people nearest us. Our task must be to embrace all living beings and all of nature" (Einstein in Mitchell, 1991, p. 189-190).

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